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BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Paper No. 14

Serial Number: 08/099,952
Filing Date: 07/30/93
Appellant(s): Jai Li,

Lisa Jorgenson,
For Appellant

MAILED

JUL 10 1995

GROUP 110

EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed 3-29-95.

(1) *Status of claims.*

The statement of the status of claims contained in the brief is correct.

This appeal involves claims 11-20 and 32.

Claims 1-10 and 21-31 have been cancelled.

(2) *Status of Amendments After Final.*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

The amendment(s) after final rejection filed on 9/19/94 been entered.

(3) *Summary of invention.*

Art Unit: 1104

The summary of invention contained in the brief is correct.

(4) *Issues.*

The appellant's statement of the issues in the brief is correct.

(5) *Grouping of claims.*

Appellant's brief includes a statement that claims 11-20 and 32 do not stand or fall together and provides reasons as set forth in 37 C.F.R. § 1.192(c)(5) and (c)(6).

(6) *Claims appealed.*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(7) *Prior Art of record.*

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

✓0123384 Harper (European Patent Application) 10-1984.

✓0271956 Hosaka (Japanese Patent Application) 11-1988.

✓0050634 Yoriune (Japanese Patent Application) 04-1980.

✓"Silicon Processing For The VLSI Era", Volume 2: Process Integration, Wolf, Lattice Press, 1990, pages 38-41.

(8) *New prior art.*

No new prior art has been applied in this examiner's answer.

(9) *Grounds of rejection.*

The following ground(s) of rejection are applicable to the appealed claims.

Art Unit: 1104

The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made. Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

Evaluations of the level of ordinary skill in the art requires consideration of such factors as various prior art approaches, types of problems encountered in the art, rapidity with which innovations are made, sophistication of technology involved, educational background of those actively working in the field, commercial success, and failure of others.

The "person having ordinary skill" in this art has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The evidence of record including the references and/or the admissions are considered to reasonably reflect this level of skill.

Claims 11-18, 20, and 32 are rejected under 35 U.S.C. § 103 as being unpatentable over Harper in view of Hosaka.

Harper teaches the instant invention substantially as claimed except for the etching of a recess into the substrate

Art Unit: 1104

(claim 11) and the forming of sidewall (claim 21). See Figs. 4-10 and Figs. 13-15 and related text.

Hosaka teaches a fully recessed LOCOS process wherein a mask comprises oxide/polysil/nitride with a sidewall of nitride is used. See abstract and Figs. 1a-1g.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified Harper's teachings as taught by Hosaka because the recessed LOCOS would have advantage over conventional LOCOS such as improvement of surface planarity and an increase in packing density (due to limited lateral encroachment), absent any showing of criticality or unexpected results by applicant.

As for claim 32, absent any showing of criticality by applicant, the etching of recesses to different respective depths is merely a matter of optimization to one skilled in the art. For example, depend on a particular design of an integrated circuits, some isolation areas require deeper buried oxide in the substrate than the others, the recesses there would then be made deeper.

Claim 19 is rejected under 35 U.S.C. § 103 as being unpatentable over Harper in view of Wolf and Yoriune.

Harper teaches the instant invention substantially as mentioned above except for the etching of recess into the

Art Unit: 1104

substrate (claim 11) and the forming of nitride sidewall in conjunction with the use of nitride/oxide/nitride LOCOS mask.

Wolf teaches a fully recessed LOCOS in which a LOCOS mask of oxide/nitride is covered with a nitride layer at its sidewalls (see pages 39-40 and Fig. 2-26 (b)).

Yoriume teaches a LOCOS process using a LOCOS mask of nitride/oxide/nitride (see abstract and Fig. 2G-H).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Harper's teachings because of the followings: a) recessed LOCOS (etching a recess into the substrate) technique is advantageous over conventional LOCOS since this method improves the surface planarity and reduces bird's beak encroachment (Wolf, page 39-40) and b) the use of nitride/oxide/nitride mask as taught by Yoriume would further reduce stress generated in the device region as in the case when conventional oxide/nitride mask is used.

(10) New ground of rejection.

This Examiner's Answer does not contain any new ground of rejection.

(11) Response to argument.

The objection of the specification and the rejections under 35 U.S.C. § 112, first and second paragraph have been dropped since appellant has cancelled the limitation pertaining to the

Art Unit: 1104

formation of first and second patterned layers with different respective critical dimensions in the amendment after final.

In page 6 of the brief, appellant argues that Hosaka shows the general concept of recess-etching sources and drains, but appellant does not claim this concept. The examiner disagrees. Clearly shown in figure 1(c), the recesses are etched in the isolation regions, not source/drain regions. Appellant further faults the examiner as not showing motivation to combine references. This is found unconvincing since the deficiency of Harper's process (the conventional LOCOS process) is provided by a fully recessed LOCOS process in Hosaka. The motivation to combine Harper with Hosaka lies in the fact that fully recessed LOCOS process is advantageous over conventional LOCOS process in that surface planarity and high packing density (due to limited lateral encroachment of the field oxide into the active region) can be obtained (compare Fig. 1(g) in Hosaka with Fig. 11 in Harper). Appellant also argues that prior art does ^{not} suggest the desirability to perform recess-etching step. In rebuttal, an express suggestion for modifying or combining the references relied upon need not be contained in any of the individual reference because the proper question to be asked (and answered) is what do the references collectively suggest to one of ordinary skill in the art? In re Lindell, 155 USPQ 21; In re Rinehart,

Serial Number: No. 099,952

-7-

Art Unit: 1104

189 USPQ 143; In re Baranakas, 158 USPQ 24; In re Lamberti et al, 192 USPQ 78; In re Luck et al 177 USPQ 523.

In the present instance the invention embraced by the above rejected claims can be made merely by applying knowledge clearly present in the prior art, as explained in the previous Office action. In re Sernaker, 217 USPQ 1.

As for claim 32, without any showing of criticality by appellant, the etching of recesses to different respective depths is merely a matter of optimization to one skilled in the art since it has been held that discovery an optimum value of a result effective variable involves only routine skilled in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

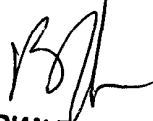
For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

T. Dang:rg

June 29, 1995

T.D


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